DOCUMENT RESUME

ED 479 559 IR 022 165

AUTHOR	Johnson, Scott D.; Aragon, Steven R.
TITLE	An Instructional Strategy Framework for Online Learning Environments.
PUB DATE	2002-10-00
NOTE	9p.; In: E-Learn 2002 World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education. Proceedings (7th, Montreal, Quebec, Canada, October 15-19, 2002); see IR 022 093.
AVAILABLE FROM	Association for the Advancement of Computing in Education (AACE), P.O. Box 3728, Norfolk, VA 23514. Tel: 757-623-7588; e-mail: info@aace.org; Web site: http://www.aace.org/DL/.
PUB TYPE	Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS
DESCRIPTORS	Computer Assisted Instruction; *Distance Education; Educational Principles; *Instructional Design; Instructional Development; Learner Controlled Instruction; Learning Theories; Online Systems; *Teaching Methods; Teaching Models

ABSTRACT

The rapid growth of Web-based instruction has raised many questions about the quality of online courses. It appears that many online courses are simply modeled after traditional forms of instruction instead of incorporating a design that takes advantage of the unique capabilities of Web-based learning environments. This paper describes a research and development effort that evolved during the creation of an HRD graduate program (HRE Online) that was taught entirely online. It presents a conceptual framework that can guide the development of online courses. The authors contend that powerful online learning environments need to contain a combination of these principles: address individual differences; motivate the student; avoid information overload; create a real-life context; encourage social interaction; provide hands-on activities; and encourage student reflection. Specific examples of instructional strategies that fit the framework are described in detail. (Contains 23 references.) (Author/AEF)

Reproductions supplied by EDRS are the best that can be made
from the original document.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

G.H. Marks

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2B

An Instructional Strategy Framework for Online Learning Environments

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Scott D. Johnson
Human Resource Education
University of Illinois at Urbana-Champaign
United States
sjohnson@uiuc.edu

Steven R. Aragon
Human Resource Education
University of Illinois at Urbana-Champaign
United States
aragon@uiuc.edu

ED 479 559

Abstract: The rapid growth of web-based instruction has raised many questions about the quality of online courses. It appears that many online courses are simply modeled after traditional forms of instruction instead of incorporating a design that takes advantage of the unique capabilities of web-based learning environments. The authors present a conceptual framework that can guide the development of online courses. Specific examples of instructional strategies that fit the framework are described in detail.

Introduction

Distance education is an instructional delivery system that allows students to participate in an educational opportunity without being physically present in the same location as the instructor. Although print-based correspondence study is the traditional method of distance education, more contemporary approaches rely heavily on various forms of instructional technology (Garrison, 1987). The reason for much of the growth in distance education programs in recent years is due to the development of the Internet and improvement of technologies that support online learning environments. For example, among higher education institutions offering distance education, use of two-way interactive video and one-way prerecorded video was essentially the same in 1997–98 as in 1995 while the use of asynchronous Internet-based technologies nearly tripled in that same time period (Lewis, Snow, Farris, Levin, & Greene, 1999). This change is not new to the distance education community, which has seen technology-based educational innovations come and go with much fanfare. The instructional films of the 1940's were expected to radically change the educational delivery system, as were instructional radio and television. While each of these technology innovations had some impact on educational programs, they did little to change the fundamental nature of education. The Internet and computer technology, as the next generation of technological innovation to impact distance education, appears to have the power to significantly alter the education landscape.

In spite of the rapid growth of distance education, there is considerable concern about the effectiveness of this educational innovation. Numerous studies comparing traditional classroom-based instruction with technology-supported instruction have found no significant differences on critical educational variables such as learning outcomes and student satisfaction (Clarke, 1999; Johnson, Aragon, Shaik, & Palma-Rivas, 2000; Navarro & Shoemaker, 1999; Smeaton & Keogh, 1999). A popular web site (http://teleeducation.nb.ca/nosignificantdifference) contains a listing of over 300 research reports on technology for distance education (Russell, 1999). This comprehensive bibliography spans seven decades and highlights studies that found little or no significant impact of instructional technology on various educational variables.

The obvious conclusion of many scholars in the field is that the technology used to support instruction has little impact on students' attainment of educational outcomes. The primary factor in any instructional initiative, irregardless of format or venue, is the quality of the instructional design that is ultimately implemented.

This paper describes a research and development effort that evolved during the creation of an HRD graduate program (*IIRE Online*) that was taught entirely online. The learning environment that was created to

IR022165

BEST COPY AVAILABLE

support *HRE Online* was based on the assumption that learning is a complex event that cannot be explained with a single theory of learning. Instead, we hypothesized that quality learning environments should be based on instructional principles that are derived from multiple learning theories. Through an analysis of existing literature and experienced-based practices throughout the development of *HRE Online*, we sought to answer the following questions:

1. What instructional principles for online learning environments can be derived from a fusion of multiple theories of learning?

2. Based on those principles, what specific instructional strategies or techniques can be applied in an online learning environment?

Instructional Principles for Online Learning Environments

The pedagogical model used to develop the *HRE Online* master's degree program was created by building on specific aspects of adult learning theory (Bandura, 1971; Skinner, 1968; Thorndike, Bregman, Tilton, & Woodyard, 1928; Vygotsky, 1978). Two conceptual models that were developed from an extensive study of the literature were reviewed. These two models were then synthesized into seven general principles that appear to be critical for quality learning environments (Johnson & Thomas, 1992; Johnson, 1997). We contend that powerful online learning environments need to contain a combination of these principles: (1) address individual differences, (2) motivate the student, (3) avoid information overload, (4) create a real-life context, (5) encourage social interaction, (6) provide hands-on activities, and (7) encourage student reflection (see Figure 1). This pedagogical model for online instruction was used to create the design template that is followed for each course in the *HRE Online* program. The following section provides specific examples of instructional strategies that have been used in the *HRE Online* program. Each of these strategies highlights the importance and practical application of the seven principles of quality online learning environments.

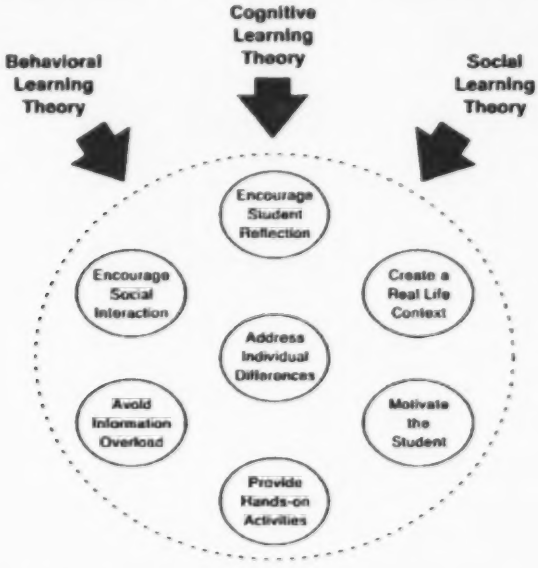

Figure 1. An Instructional Strategy Framework for Online Learning Environments

Using the Framework to Create Instructional Strategies for Online Courses

Individual Differences

Individual differences specific to learning and instruction can be found within intelligence, cognitive controls, cognitive styles, learning styles, personality types, and prior knowledge (Jonassen & Grabowski, 1993). Each dimension helps us understand 1) patterns of thinking and reasoning about information, 2) how individuals process information to make sense of the world, 3) preferences for information processing, and 4) how past knowledge, skills, or ability influence the learning process. Each of these dimensions, collectively, helps to describe one's personality.

Recognition of individual differences has, for the most part, been taken into account and promoted through the instructional design template used in *HRE Online*. The following techniques and strategies have been used in our online courses to address individual differences.

1. *Provide content in multiple formats.* This is done through the use of various communication technologies. Lectures are audio streamed and synchronized with the applicable PowerPoint presentation. These lectures are additionally transcribed and posted in the course website. Content is also presented through WebBoard discussion groups. Each course also has links to outside web sites that provide supplemental material on the current topic.

2. *Allow for individual locus of control.* All courses provide various means of navigation within the online course. Content can be accessed through links or a graphical organizer. An individual can be as systematic or random in his or her access of course material as they desire. Although the course is built and presented in a hierarchical sequence, it does not have to be accessed in the same way. While it is not necessarily encouraged, students are also not discouraged from moving through the course in a random order.

3. *Encourage active and collaborative interaction.* Recognizing that "the whole is greater than the sum of the parts," each course is designed with activities that are both individual and group based. Working within "virtual teams," students work together to solve problems, analyze cases, and develop group deliverables. These assignments allow individual ideas, perspectives, and experiences to be heard and collectively considered.

Motivation

The ARCS Model of Motivation is a practical way for instructors to address the issue of student motivation (Keller & Suzuki, 1988). This model breaks motivation into four major concepts; (1) Attention, (2), Relevance, (3), Confidence, and (4) Satisfaction. Instructors must be able to gain and maintain students' attention by providing an environment that is interactive and participative. While keeping the students' attention is critical, it cannot be maintained unless the students feel that the course material is relevant. Students must also feel confident that they can achieve the expected outcomes of the course; therefore instruction should be flexible to compensate for individual student needs. The final component of the ARCS Model is satisfaction, which corresponds to whether or not students derive satisfaction from the instruction.

Strategies for enhancing student motivation in a web-based environment can best be characterized as either novel and entertaining approaches or attempts to personalize the instruction. We have successfully used to following techniques to enhance the motivation of our online students.

1. *Incorporate games into the online environment.* An example of a successful game for an online course is the popular television show called "Who Wants To Be A Millionaire." We have used this game during live synchronous sessions to summarize course content covered previously and to provide a sense of community among the students. The instructor plays the role of Regis Philbin, the game show host, and reads a question that requires the students to put a sequence of answers in the correct order. The students then type the correct order (e.g., B, C, D, A) as quickly as they can into a WebBoard chat window. The student who first answers

correctly becomes the contestant who calls a toll free number so their voice can be patched through to the class. This provides live dialogue when the instructor asks a student the first of several multiple-choice questions.

2. *Simulate a radio talk show with multiple DJs and "call-in" guests.* In many online courses the students spend much of the "class time" listening to the instructor through streaming audio or video technologies or during a live "web cast" during a synchronous class session. As we all know, it can be both boring and difficult to listen to one voice for any length of time, especially when there are few visual cues to accompany the audio. To provide variety and a livelier online atmosphere, we have been successful having multiple speakers interact during these broadcasts to liven up the synchronous sessions.

3. *Use multimedia when appropriate.* Online courses tend to be primarily textual-based forms of instruction. We have found that graphic images, photographs, and videos enhance student motivation. For example, in several of our courses we have created short QuickTime clips from popular movies and television shows that can be streamed over the web. These clips provide entertaining examples that support the concepts and procedures being discussed in class and provide a nice break from the textual format that dominates current online environments.

Information Overload

Providing too much information in a short period of time contributes to memory overload, which makes learning difficult and leads to confusion and poor retention. Psychological studies show that most people can manage about seven "pieces" of information at one time without too much difficulty (Miller, 1956). Instructional designers need to follow the *Rule of Seven*, which suggests that the amount of information presented at one time should be limited to no more than seven pieces of content (Clement, 1985). The Rule of Seven suggests that instructional designers "chunk" instructional content into small groups and give students the opportunity to learn each "chunk" thoroughly before being presented with new information. The following strategies have been used successfully in our online program.

1. *Limit the amount of content and activities.* By following the Rule of Seven, we help avoid memory overload by purposely limiting the amount of information and activities we provide in a course. For example, we ask instructors to break their lectures into 10-12 minute "chunks" or segments. These short lectures are recorded and converted into streaming media for delivery to students. These short lectures make it easier for students to complete in one sitting and it forces the instructor to concentrate on only a few main concepts in each "mini" lecture.

2. *Organize instruction around learning cycles.* The instructional design model used in the *HRE Online* program utilizes learning cycles at the core of its modular approach. Each learning cycle is comprised of three components. The first component provides the student with access to new content through a streamed audio or video file or by reading an online article. The last component of the learning cycle involves evaluating the learning outcomes through an activity involving self-assessment, peer-assessment, or formal instructor assessment and feedback.

3. *Provide a graphic organizer for the course.* It is very easy for students to get lost in any hypertext environment as they navigate through online courses that contain extensive layers of content distributed over multiple locations. To avoid the frustration and memory overload that can occur in a web-based environment, we provide a visual representation of the course structure. This graphic organizer serves as a map for students as they navigate through various portions of the course. The graphic is also hyperlinked so students can quickly move to a desired location in the course by clicking directly on the image.

Contextual Learning

Context is an essential central element in learning because knowledge is a product of the activity, context, and culture in which it is developed and used (Brown, Collins, & Duguid, 1989). Wilson (1993) identifies three major premises of context and how these affect knowing and learning. The first is the idea that learning and thinking are social activities that are structured by constant interpersonal interaction. Second, the available tools within the particular situation significantly structure an individual's ability to think and learn. Finally, "human thinking is

profoundly structured by interaction with the setting" (p. 72). We offer the following recommendations to online instructors to promote contextual learning in the virtual classroom.

1. *Create virtual learning teams.* At the start of each new course, students are placed in a virtual learning team consisting of three to four other classmates. This allows the instructor to replicate the group experience found in face-to-face settings. Students work together on weekly assignments and projects via conferencing systems, conference calls, e-mail, and Instant Messenger.

2. *Simulate reality using appropriate case studies.* Regardless of the delivery format, the more "real-life" examples that can be utilized, the better students will learn. Case studies are an excellent way to provide the context through which new learning can be developed. As with any situation where a case study is used, it is critical to choose cases that relate to the content of the course.

3. *Require collaborative projects with schools, businesses, or other organizations.* Students are encouraged, where possible and appropriate, to develop course projects within the context of their work environment. This provides a real-life context in which to imbed application of the material. For example, in the online instructional design course, students develop a training package that represents 68 hours of training time. The majority of the students choose to develop a training package that addresses a performance issue within their organization.

Social Learning

Social learning theory combines elements from both behaviorist and cognitive theories and posits that we learn best by interacting with others in social settings (Merriam & Caffarella, 1999). Social learning is manifested through socialization, social roles, mentoring, and locus of learning.

For the social learning theorist, the purpose of education is for the learners to have new roles and behaviors modeled for them. Instructors and peers serve as a model for new roles and behaviors within an educational context. The following strategies have been successfully used by online faculty to promote this perspective.

1. *Create a personal connection with students.* Our goal is for instructors to be perceived as a real person in mediated communication. This is promoted several ways. Each course has an audio-streamed welcome message from the faculty member. This helps the student to put a face with the voice. Additionally, actions such as humor, vocal variety, personalizing examples, addressing students by name, questioning, praising, initiating discussion, and encouraging feedback all help make this connection. Personal connection can also be made through the use of "relational icons" or "emoticons" made by combinations of punctuation marks.

2. *Peer review and feedback.* Feedback from fellow students is as important as instructor feedback. Therefore, students in many online classes are asked to provide a meta-evaluation of another student's work. The purpose of the activity is to help their peers by providing comments that help the person understand the areas that are clear and well done and the parts that need further development.

3. *Require and facilitate interaction.* This may not seem like a new approach, however, in the online environment, it is much easier for students to be passive both in weekly assignments involving the group as well as during synchronous chat sessions. In addition to basing a percentage of the course grade on participation, other initiatives can be taken as well. One is to post an agenda of the upcoming week's synchronous session. Another technique is to post discussion questions prior to a synchronous session. Both approaches encourage students to think about the topic and be ready for a discussion.

Active Learning

Active learning can occur in many forms in an online environment. Discovery learning, project-based learning, and cooperative learning are common techniques for engaging students in activities that involve considerable amounts of creativity, decision-making, and problem solving. The following are specific examples of how active learning can be applied in an online environment.

1. *Organize online courses around projects.* Since HRD is a constantly evolving applied field of study, it is reasonable to design an online HRD course with a heavy emphasis on the application of the skills and procedures needed by the HRD professional. The best way to accomplish this in an online environment is through a project-based approach. Application-rich courses can be designed around major projects and specific activities to be completed in order to create a final product.

2. *Think-Pair-Share in a virtual environment.* Having online students work in groups of two or three within a virtual environment is a great way to keep students active and focused on their learning. Think-pair-share is an active learning technique used in many face-to-face classes but is rarely used in a virtual environment. The goal is to help students organize prior knowledge, brainstorm questions, or summarize, integrate, and apply new information. This strategy can be used in both synchronous and asynchronous situations.

3. *Use small group discussions during synchronous sessions.* We conduct weekly synchronous sessions in our program where the instructor performs a live audio broadcast to the students over the web while the students interact with the instructor and other students in a group chat space. While this in itself encourages active learning, incorporating small group interactions into the large group discussions further enhances it. This is accomplished by having the instructor describe a discussion activity to the class and then asking them to enter their private "virtual team" chat space to discuss and complete the assignment. A specific time is given when the students are expected to return to the class chat space and share the major points of their discussion with the rest of the class.

Reflective Learning

Mezirow (1990) defines learning as "the process of making a new or revised interpretation of the meaning of an experience, which guides subsequent understanding, appreciation, and action" (p. 1). Reflection allows individuals to correct distortions in their beliefs and critique "the presuppositions on which our beliefs have been built" (Mezirow, 1990, p. 1). The process of reflection enables the ideas, understandings, and experiences of individuals and groups to be reviewed (Preskill & Torres, 1999). Watkins and Marsick (1993) see reflection as a key to continuous learning. The following three strategies can be used to promote reflective learning.

1. *Provide extensive and timely feedback.* While this is something most instructors already know, it is important to remember that the online environment removes some of the human "checks and balances" that face-to-face students have with the instructor. While the opportunity to ask questions and have interaction with the instructor is relatively equal, feedback received through physical distance, eye contact, facial expressions and personal topics of conversation is not present for these individuals. Therefore, it becomes even more important that the instructor take time to provide feedback that is detailed enough to paint a complete evaluative picture.
2. *Incorporate "One Minute Papers" and "Muddiest Point" into class.* "One Minute Papers" are short writing exercises in which students are asked to reflect on a particular topic as a form of knowledge assessment activity. Students are asked to post a quick list of the new knowledge they gained through a particular session. The "Muddiest Point" activity allows students to identify the areas of confusion or uncertainly and/or to raise additional questions around the content of the session. Both of these activities benefit the students and instructor by providing feedback on what was clear and what may need further attention through the use of reflection.

3. *Online diaries or reflective journals.* Diaries and journals promote continuous reflection throughout the course. Entries can be self-directed or promoted by an issue, question, or experience posed by the instructor. Journals allow students to reflectively interact with various course topics and experiences and, as noted earlier, critically examine how their values, beliefs and attitudes fit with the material. This is a way that promotes growth beyond what regular instructor and student interactions provide.

Concluding Thoughts

The instructional strategy framework discussed in this paper is clearly a work in progress. Although the framework is based on well-recognized theories of learning and represents a synthesis of ideas from multiple perspectives, it is not fully developed, nor is it all-inclusive. Additional principles will be added as the online program continues to develop and evolve. The specific techniques for applying the instructional principles highlighted in this paper are currently in use in the *HRE Online* courses and continue to be enhanced each time they

are implemented. The possibilities for application of the instructional strategy framework are only limited by the creativity and energy of the instructional designers and course instructors.

Formalized research efforts need to be conducted to validate and improve the strategy framework and the instructional techniques that evolve from it. Studies that examine the effectiveness of instructional strategies in online courses are lacking in the educational technology literature. Most literature provides anecdotal comments on experiences with online courses and empirical research that compares face-to-face and online delivery methods. Instead of comparing two dissimilar learning environments, future studies should empirically test the effectiveness of different instructional techniques in maximizing learning opportunities and achievement in online environments.

References

Bandura, A. (1971). *Social learning theory*. New York: General Learning Press.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher, 18*(1), 32-42.

Clarke, D. (1999). Getting results with distance education. *The American Journal of Distance Education, 12*(1), 38-51.

Clement, F. J. (1985). The rule of seven revisited. *Performance & Instruction Journal, 24*(2), 6-8.

Garrison, D. R. (1987). The role of technology in distance education. *New Directions for Continuing Education, 36*, 41-53.

Johnson, S. D. (1997). Learning technological concepts and developing intellectual skills. *International Journal of Technology and Design Education, 7*, 161-180.

Johnson, S. D., Aragon, S. R., Shaik, N., & Palma-Rivas, N. (2000). Comparative analysis of learner satisfaction and learning outcomes in online and face-to-face learning environments. *Journal of Interactive Learning Research, 11*, 29-49.

Johnson, S. D., & Thomas, R. G. (1992). Technology education and the cognitive revolution. *The Technology Teacher, 51*(4), 7-12.

Jonassen, D. H., & Grabowski, B. L. (1993). *Handbook of individual differences, learning and instruction*. Hillsdale, NJ: Erlbaum.

Kellar, J. M., & Suzuki, K. (1988). Use of the ARCS motivation model in courseware design. In D. Jonassen (Ed.), *Instructional designs for microcomputer courseware*, (pp. 401-434). Hillsdale, NJ: Erlbaum

Lewis, L., Snow, K., Farris, E., Levin, D., & Greene, B. (1999). Distance education at postsecondary education institutions: 1997-98 [Report No. NCES 2000-013]. Washington, DC: U. S. Department of Education, National Center for Education Statistics.

Miller, G. A. (1956). The magical number seven, plus or minus two. *Psychological Review, 63*, 81-97.

Merriam S. B., & Caffarella, R. S. (1999). *Learning in adulthood: A comprehensive guide* (2nd ed.). San Francisco: Jossey-Bass.

Mezirow, J. (1990). How critical reflection triggers transformative learning. In J. Mezirow (Ed.), *Fostering critical reflection in adulthood* (pp. 1-20). San Francisco: Jossey-Bass.

Navarro, P., & Shoemaker, J. (1999). The power of cyberlearning: An empirical test. *Journal of Computing in Higher Education, 11*(1), 29-54.

Preskill, H., & Torres, R. T. (1999). *Evaluative inquiry for learning in organizations*. Thousand Oaks, CA: Sage.

Russell, T. L. (1999). *The no significant difference phenomenon*. Raleigh, North Carolina: North Carolina State University.

Skinner, B.F. (1968). *The technology of teaching*. New York: Appleton-Century-Crofts.

Smeaton, A., & Keogh, G. (1999). An analysis of the use of virtual delivery of undergraduate lectures. *Computers and Education, 32*, 83-94.

Thorndike, E. L., Bregman, E. O., Tilton, J. W., & Woodyard, E. (1928). *Adult learning*. New York: Macmillan.

Vygotsky, L. S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.

Watkins, K. E., & Marsick, V. J. (1993). *Sculpting a learning organization*. San Francisco: Jossey-Bass.

Wilson, A. L. (1993). The promise of situated cognition. *New Directions for Adult and Continuing Education, 57*, 71-79.

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

NOTICE

Reproduction Basis

[X] This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

[ ] This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").